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A REVISION OF THE GENUS *DAGUS* CRESSON (DIPTERA: EPHYDRIDAE)

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Abstract.—*Dagus* Cresson, a genus of tropical, New World flies, is revised, to include two new species, *D. **wirthi*** (Jamaica) and *D. **trichocerus*** (Cuba). Previously, the genus was monotypic, with *D. rostratus* (Cresson) as its only included species.

Since reviewing the tribe Dagini (Mathis, 1982), I have discovered new data concerning the genus *Dagus* Cresson, and this paper presents these data as a revision of that genus. Although *Dagus* was recently reviewed, in the previously cited paper, the finding of two new species warrants revision of that genus. Until the present study, *Dagus* was a monotypic genus, with *D. rostratus* (Cresson) as its only included species. Two additional species, both from the Greater Antilles (Cuba and Jamaica), bring the number of species in the genus to three and alter the concept of *Dagus* slightly, which is recharacterized herein.

The descriptive terminology follows that published in the recent *Manual of Nearctic Diptera, Vol. 1* (McAlpine, 1981) with one exception. I have followed Sabroksy (*in press*) in using "microtomentum" rather than pruinescence or pollinosity for the dustlike vestiture over much of the cuticular surface. The dustlike appearance is the result of cuticular microtrichia at various densities, not a waxy substance, as on a plum (pruinescence), or dust (pollinosity). Two head ratios and two venational ratios are used in the species' descriptions and are defined here. Eye-to-cheek ratio: genal height (immediately below the eye)/eye height; eye width-to-face length ratio: face length (in profile from anterior margin of eye to anterior margin of face)/eye width (greatest length along plane of eye); costal vein ratio: the straight line distance between R_{2+3} and R_{4+5}/distance between R_1 and R_{2+3}; M vein ratio: the straight line distance along M basad of crossvein dm-cu/distance apicad of crossvein dm-cu. For convenience and continuity, the descriptive format essentially follows Mathis (1982), and that paper should be consulted for perspective to this study and as the basis for this report.

Genus *Dagus* Cresson

Dagus Cresson, 1935: 345 [type-species: *Ephydra rostrata* Cresson, by original designation and monotypy]; Wirth, 1968: 24 [catalog]; Mathis, 1982: 20 [review].

Diagnosis.—Specimens of *Dagus* resemble those of *Psilephydra* Hendel, *Physemops* Cresson, and *Diedrops* Mathis and Wirth but may be distinguished by the following characters:

Head: Ocellar bristles present, well developed; lateroclinate fronto-orbital bristles 3, anterior bristle smaller, about ½ to ⅔ length of posterior bristles; arista variable; 1st flagellomere nearly twice length of 2nd antennal segment, and greater than combined length of first 2 segments; face with ventral portion, ½ to ⅔, protrudent, uniformly arched vertically, pointedly arched transversely, dorsum of protrusion bare to very thinly microtomentose, shiny, with metallic reflections, becoming more densely to completely microtomentose ventrally and laterally, subshiny to dull; facial setae sparse but with prominent series along oral margin and from facial carina to posteroventral angle of face, larger bristles of latter series porrect and anaclinate; genal bristle present, although small, generally inconspicuous.

Thorax: Prescutellar acrostichal setae variable; anterior scutellar setae small, less than ½ length of posterior bristles; dorsocentral bristles stronger postsuturally, usually with 1–2 larger seta at suture or presuturally; posterior notopleural bristle inserted at level above that of anterior bristle; propleuron bare of setulae; katepisternal bristle weakly developed, especially as compared to anepisternal bristle; apex of vein R_{2+3} well separated from vein R_{4+5}, distance between these two about equal to that between veins R_{4+5} and M; costal vein ratio about 0.15; M vein ratio about 0.65; pulvilli lacking or greatly reduced; tarsal claws comparatively long, straight, oriented anteriorly, frequently held together throughout length.

Abdomen: Male terminalia: epandrium, in posterior view, abbreviated dorsally, not forming cercal cavity around cerci, ventral portion with a median cleft; cerci placed at dorsal margin of epandrium; aedeagal apodeme about 2× as long as wide, roughly oval; aedeagus long and slender, length subequal to that of epandrium.

Distribution.—New World tropics between 30° north latitude and 10° south latitude.

Discussion.—Within the tribe Dagini, *Dagus* is postulated to be the sister group of *Physemops,* based entirely on the elevated insertion of the posterior notopleural bristle in both genera (Mathis, 1982). Elsewhere in the family, an elevated insertion for the posterior notopleural bristle occurs, and by itself, this character is not the strongest of evidence to indicate the monophyly for the two lineages. Both genera do have this character, however, and within the tribe the character does appear to be unique. Until other characters are discovered and analyzed, this character can serve as a point from which to base our current hypothesis.

The monophyly of *Dagus,* on the other hand, is quite adequately established, as I demonstrated earlier (1982). The essential characters are as follows:

1. Postpronotal callus bearing one or two setulae. In most genera of Ephydrinae, the postpronotal callus is either bare or has conspicuous bristles. The presence of one to two setulae is an autapomorphy for *Dagus.*

2. Pulvilli lacking. *Dagus* is the only genus within the tribe and one of the few among shore flies generally, which lack pulvilli, and I interpret this condition to be autapomorphic.

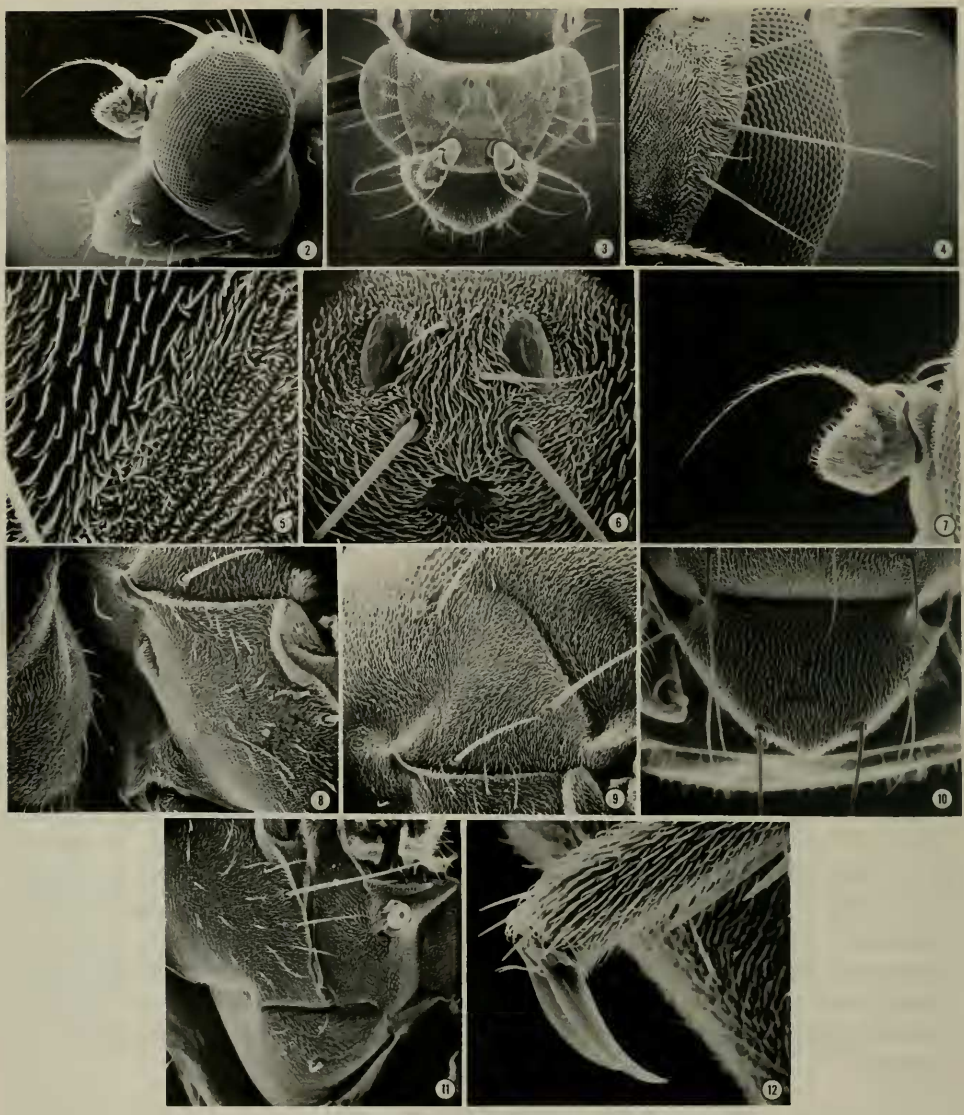
3. Ventral protrusion of lower one-half of face. In most species of Dagini the face is shieldlike, shallowly protrudent. Only in species of *Dagus* is the face distinctly protrudent, evenly arched horizontally and somewhat pointedly arched transversely.

Fig. 1. Habitus of *Dagus rostratus*.

The tribal assignment for *Dagus* has vacillated, although it has always been within the subfamily Ephydrinae. Cresson (1935), followed by Wirth (1968), placed the genus in Ephydrini. In 1979, I listed *Dagus* plus *Diedrops, Physemops,* and *Psilephydra* as a questionable and separate lineage within Ephydrinae, outside of the tribe Ephydrini and within the paraphyletic tribe Scatellini. Subsequently (Mathis, 1982), I formally recognized *Dagus* and the other genera mentioned above as a separate tribe, Dagini. The relationship of Dagini within Ephydrinae, however, is presently unresolved, and indeed, the basis for Dagini, as a distinct, monophyletic lineage, is not founded on character evidence that is totally convincing.

Key to Species of *Dagus*

1. Larger species, length greater than 2.25 mm; dorsocentral bristles 5 pairs; arista appearing essentially bare, hairs inconspicuous (Jamaica) ..... *D. wirthi,* new species
– Smaller species, length generally less than 2.25 mm; dorsocentral bristles 3–4 pairs; arista with hairs evident 2
2. Arista long, 3–4× length of 1st flagellomere, conspicuously haired, with hairs considerably longer than aristal width at base (Cuba) ..... *D. trichocerus,* new species
– Arista short, at most slightly more than 2× length of 1st flagellomere, inconspicuously haired, length of hairs no greater than aristal width at base ..... *D. rostratus* (Cresson)



Figs. 2–12. *Dagus rostratus*. 2, Head, lateral view. 3, Head, dorsal view. 4, Frons, dorsal view of left side. 5, Microtomentum of mesofrons (sparse) and parafrons (dense), dorsal view. 6, Ocelli and bristles, dorsal view. 7, Antenna, lateral view. 8, Proepisternum and anepisternum, lateral view. 9, Notopleuron and bristles, lateral view. 10, Scutellum, dorsal view. 11, Anepisternum, katepisternum, and bristles, lateral view. 12, Midleg, apex of fifth tarsomere and claws.

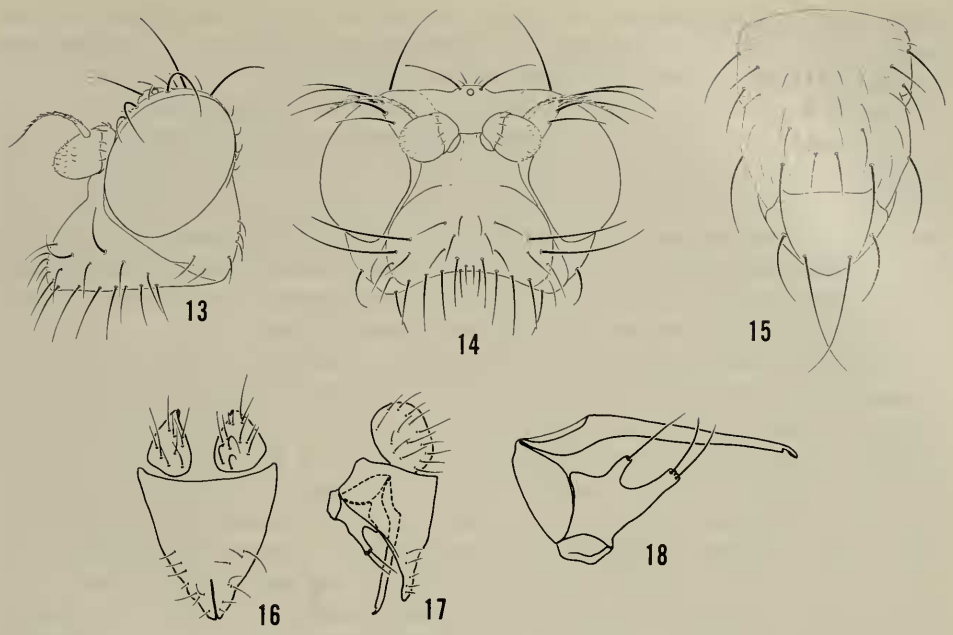
Dagus rostratus (Cresson)

Figs. 1–18

Ephydra pygmaea Williston, 1896: 402 [preoccupied, Haliday, 1833: 174].

Ephydra rostrata Cresson, 1918: 66 [new name for *E. pygmaea* Williston; fig. of head].

Dagus rostrata: Cresson, 1935: 346 [designated as type-species of *Dagus*]; Wirth, 1968: 24 [in part, catalog].



Figs. 13–18. *Dagus rostratus*. 13, Head, lateral view. 14, Head, anterior view. 15, Thorax, dorsal view. 16, Epandrium and cerci, posterior view. 17, Epandrium, cerci, and internal male genitalia, lateral view. 18, Internal male genitalia, lateral view.

Dagus rostratus: Mathis, 1982: 21 [in part, review, figs. of head and male terminalia].

Diagnosis.—Small to moderately small shore flies, length 1.60 to 2.00 mm.

Head (Figs. 2–7, 13–14): Frons with mesofrons thinly microtomentose, subshiny to shiny, remainder of frons densely microtomentose, appearing velvety, brownish black to black. Facial protrusion in lateral (Fig. 2) view with anterodorsal surface more acutely angulate with oral margin; dorsal ½ of facial protrusion mostly bare, shiny, bronzish brown to dark blue, otherwise microtomentose, mostly brown, contrasting with mostly grayish gena. Aristal length (Fig. 7) slightly more than 2× length of 1st flagellomere; arista short, generally inconspicuous, less than width at base. Gena moderately short, eye-to-cheek ratio 0.33; eye width-to-face length ratio 0.56.

Thorax (Figs. 8–12, 15): Thoracic chaetotaxy evident but not strongly developed. Dorsocentral bristles at most 3–4, including laterally displaced posterior bristle; postsutural intra-alar setae generally not well developed, occasional specimen with 1–2 setae; posterior notopleural bristle usually conspicuously displaced anteriorly from notopleural suture as compared with anterior bristle, although with some variation, occasional specimen with posterior bristle insertion only slightly above level of anterior bristle (Fig. 9); basilateral scutellar bristles at most about ½ length of apical bristles (Fig. 10). Hindcoxal strap bare. Costal vein ratio 0.17; M vein ratio 0.63.

Abdomen: Male terminalia (Figs. 16–18): epandrium, in posterior view, triangular, apex narrowly rounded, with short, median cleft; lateral view of epandrium

with basal ⅓ wide, thereafter ventrally narrowed rapidly to form rather pointed apex; gonite short with 2 posterior projections, each bearing 1 or more setae; aedeagal apodeme about 2× as long as wide, roughly oval.

Type-locality.—WEST INDIES. Saint Vincent: Perseverance Valley.

Type material.—Lectotype ♂, designated by Mathis (1982), is labeled "Co-type [disk with yellow border]" "Windward side St. Vincent, W[est]. I[ndies]. H. H. Smith." "W. Indies 1907–66." "1000 feet." "Ephydra pygmaea Will [handwritten; two submarginal red borders]" "LECTOTYPE ♂ Ephydra pygmaea Williston by W. N. Mathis [handwritten; red]." The lectotype is double mounted (minute nadel in cardboard base), is in good condition (the apical segment of the right antenna is missing), and is in the British Museum (Natural History).

Other specimens examined.—GUATEMALA. Escuintla, 10 Aug 1965, P. J. Spangler (1 ♀; USNM). MEXICO. Oaxaca: Valle Nacional, 20 Dec 1962 (1 ♀; USNM). Veracruz: Orizaba, 12–22 Aug 1961, R. and K. Dreisbach (1 ♀; USNM). VENEZUELA. Rancho Grande, Aragua, 20 Nov 1973, B. Villegas (1 ♀; USNM). WEST INDIES. Dominica: Antrim, 1000 ft., 10 Mar 1956, J. F. G. Clarke (1 ♀; USNM); Clarke Hall, Cocoa Trail, 16 Jan 1965, W. W. Wirth (14 ♂, 5 ♀; USNM); Clarke Hall, 8 Jan–8 Aug 1964–66, H. Robinson, T. J. Spilman, G. Steyskal, W. W. Wirth (2 ♂, 9 ♀; USNM); Fond Figues River, 20 Jan–16 Mar 1964–65, D. Bray, W. W. Wirth (8 ♀, 1 ♂; USNM); Freshwater Lake, 23 Feb 1964, H. Robinson (1 ♀; USNM); Paqua River, Deux Branches, 3 Feb 1964, H. Robinson (1 ♂; USNM); Rosalie River, 14 Feb 1964, H. Robinson (1 ♀; USNM); South Chitern, 7 Feb 1964, H. Robinson (2 ♀; USNM). Jamaica: Hardwar Gap, stream margin, 10 Mar 1970, W. W. Wirth, T. Farr (2 ♂; USNM); Hermitage Reservoir, Jul 1958, W. B. Heed, M. Wasserman (1 ♂, 1 ♀; USNM); St. Andrew, Newcastle Road, 17 mile post, 3 May–27 Jun 1954, T. H. Farr (3 ♀; USNM).

Distribution.—West Indies (Dominica, Jamaica, Saint Vincent); Mexico south through Guatemala and Costa Rica (Cartago; Cresson, 1918: 66) to Venezuela (Rancho Grande) and Brazil (without specific locality; Cresson, 1935: 346).

Remarks.—This species is most similar to *D. trichocerus* but is distinguished from it by the shorter arista, which is inconspicuously haired, and by the mostly brown, microtomentose vestiture of the face. The male terminalia are also distinct, as described and figured.

Both Williston (1896) and Cresson (1918) initially placed this species in the genus *Ephydra* Fallén, as it has three lateroclinate, fronto-orbital bristles, lacks pulvilli, and the tarsal claws are relatively straight and long. The similarity of these characters with those of *Ephydra,* however, is due to convergence, as was later observed by Cresson (1935), who then proposed the genus *Dagus* to accommodate this species.

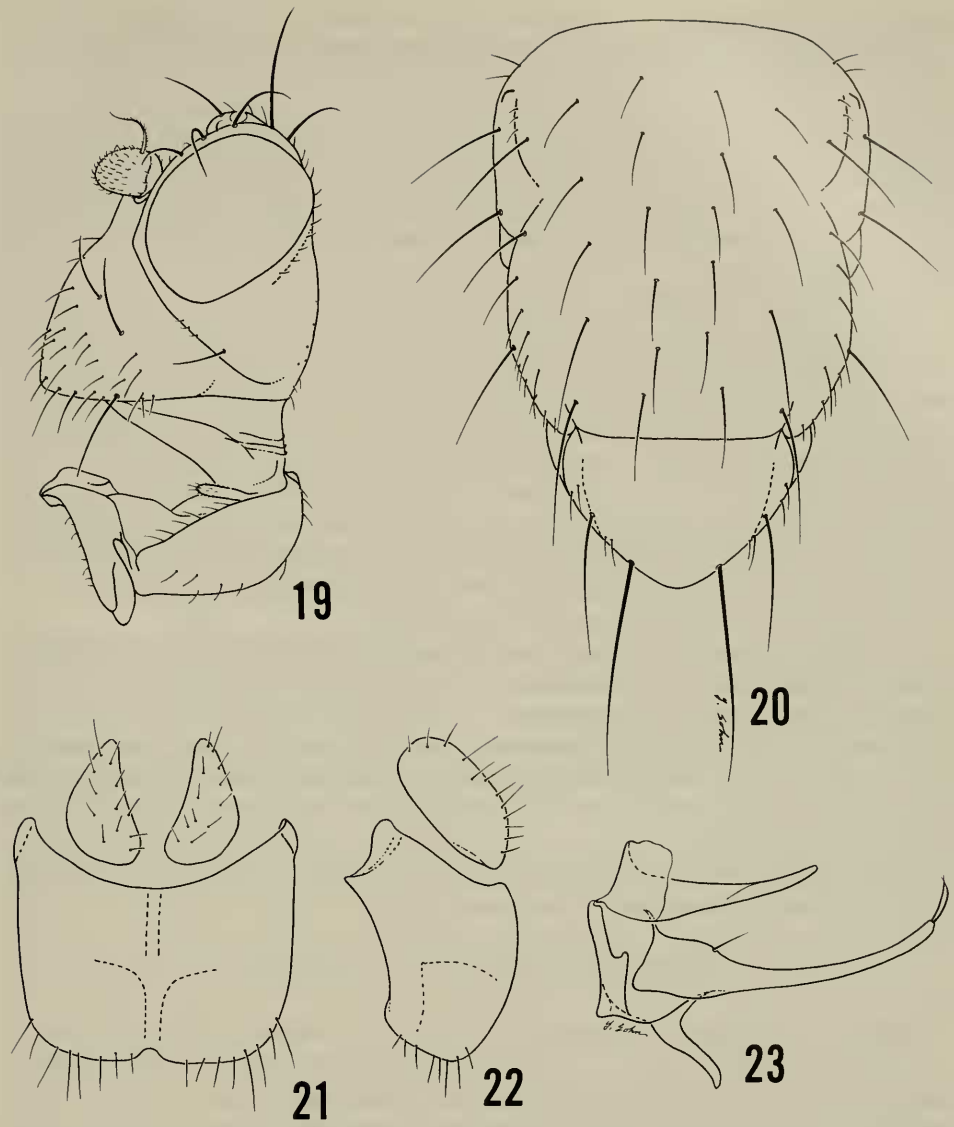
The specimens from Mexico and Guatemala are all females, and I have not been able to confirm their identity with certainty. For the present I am considering them to be conspecific with *D. rostratus.*

Dagus wirthi Mathis, New Species
Figs. 19–23

Dagus rostratus of authors, not Cresson: Wirth, 1968: 24 [misidentification in part, neotropical catalog]; Mathis, 1982: 21 [misidentification in part, review].

Diagnosis.—Moderately small shore flies, length 2.31 to 2.53 mm.

Head (Fig. 19): Frons entirely densely microtomentose, appearing velvety,



Figs. 19–23. *Dagus wirthi*. 19, Head, lateral view. 20, Thorax, dorsal view. 21, Epandrium and cerci, posterior view. 22, Epandrium and cerci, lateral view. 23, Internal male genitalia, lateral view.

brownish black to black. Facial protrusion in lateral view with anterodorsal surface less acutely angulate with oral margin; dorsal ½ of facial protrusion with bare, shiny area just below antennae, dark blackish blue, otherwise microtomentose, brown, contrasting with mostly grayish gena. Aristal length less than 2× length of 1st flagellomere, aristal hairs short, generally inconspicuous. Gena high, eye-to-cheek ratio 0.60; eye width-to-face length ratio 0.65.

Thorax (Fig. 20): Thoracic chaetotaxy evident and strongly developed. Dorsocentral bristles 5, including laterally displaced posterior bristle; postsutural intra-alar setae generally well developed, usually with 4 setae; posterior notopleural bristle only slightly displaced anteriorly from notopleural suture as compared with

anterior bristle; basilateral scutellar bristles large, about ⅔ to ¾ length of apical bristles; hindcoxal strap with 1-2 setulae. Costal vein ratio 0.14; M vein ratio 0.70.

Abdomen: Male terminalia (Figs. 21–23): epandrium, in posterior view, broadly rectangular; lateral view of epandrium with anterior margin shallowly and broadly V-shaped, vertex at basal ⅓, broadly rounded apically; gonite longer than aedeagus, tapered basally thereafter slender, mostly parallel-sided, bearing an apical, stout seta but no posterior projections; aedeagal apodeme about 2× as long as wide, roughly oval.

Type-locality.—JAMAICA. Port Parish.

Type material.—Holotype ♂ is labeled "JAMAICA:Port.Parish (near Hardwar Gap) 6 December 1975 Gary F. Hevel" "HOLOTYPE ♂ Dagus wirthi W. N. Mathis USNM 100715 [name and number handwritten; red]." The ♂ paratype (abdomen removed for dissection, in an attached microvial) is labeled "Jamaica, W[est]. I[ndies]. St. Andrew Newcastle Road 3 May 1954 T. H. Farr (over)" "17 mile post [on reverse side of first label; handwritten]." The ♀ paratype bears the same label data as the ♂ paratype except the date, which is "27 June 1954." The holotype is double mounted (minute nadel in polyporus block), is in excellent condition, and is in the National Museum of Natural History, USNM 100715.

Distribution.—Apparently endemic to Jamaica.

Etymology.—It is a pleasure to name this species after my friend and colleague, Willis W. Wirth, who has contributed so much to our knowledge of shore flies and to my development as a dipterist.

Remarks.—This is the largest species of the genus and is further distinguished from congeners by its well developed setae (5 dorsocentral bristles, 4 postsutural intra-alar setae, larger basilateral scutellar bristles), less protrudent face, higher gena, and shorter arista.

This species occurs sympatrically with *D. rostratus* in Jamaica and has been overlooked as a separate species (see synonymy).

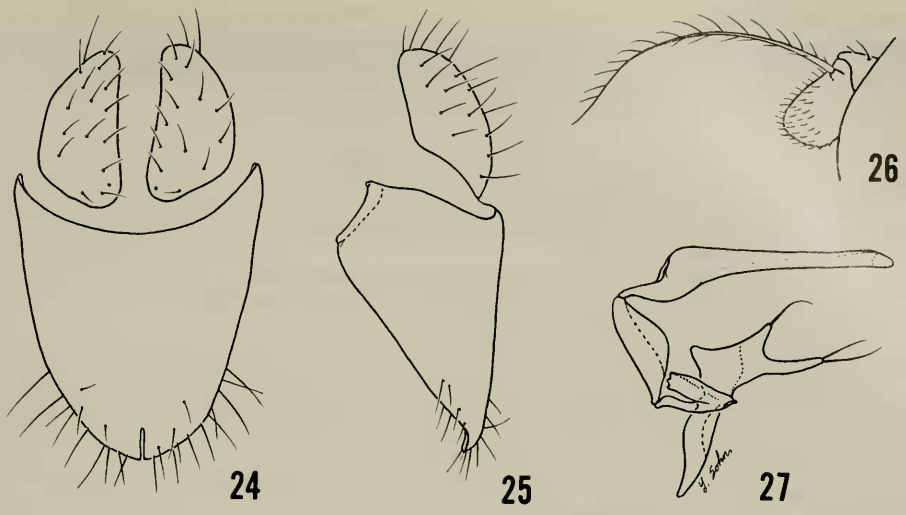
Dagus trichocerus Mathis, New Species

Figs. 24–27

Diagnosis.—Small to moderately small shore flies, length 1.70 to 2.35 mm.

Head: Frons with mesofrons thinly microtomentose to bare, subshiny to shiny, remainder of frons densely microtomentose, appearing velvety, brownish black to black. Facial protrusion in lateral view with anterodorsal surface more acutely angulate with oral margin; dorsal ½ of facial protrusion with bare, shiny area just below antennae, dark greenish blue, with metallic reflections, otherwise microtomentose, mostly whitish, concolorous with genal coloration. Aristal length approximately 3.5× length of 1st flagellomere, aristal hairs long and conspicuous (Fig. 26), approximately 2–3× aristal width at base. Gena moderately short, eye-to-cheek ratio 0.27; eye width-to-face length ratio 0.5.

Thorax: Thoracic chaetotaxy evident but not strongly developed. Dorsocentral bristles at most 3–4, including laterally displaced posterior bristle; postsutural intra-alar setae generally not well developed, occasional specimen with 1–2 setae; posterior notopleural bristle conspicuously displaced anteriorly from notopleural suture as compared with anterior bristle; basolateral scutellar bristles at most about ⅓ length of apical bristles; hindcoxal strap bare. Costal vein ratio 0.22; M vein ratio 0.67.



Figs. 24–27. *Dagus trichocerus.* 24, Epandrium and cerci, posterior view. 25, Epandrium and cerci, lateral view. 26, Antenna, lateral view. 27, Internal male genitalia, lateral view.

Abdomen: Male terminalia (Figs. 24–25, 27): epandrium, in posterior view, triangular, apex broadly rounded and with short, median cleft; lateral view of epandrium with basal ⅓ wide, thereafter ventrally narrowed rapidly to form rather pointed apex; gonite long with 2 posterior projections, each bearing 1 or more setae; aedeagal apodeme about 2× as long as wide, roughly oval.

Type-locality.—CUBA. Pinar del Rio Province: Soroa.

Type material.—Holotype ♂ is labeled "CUBA: Pinar del Rio Prov. Soroa 27–28 Apr 1983 Wayne N. Mathis" "HOLOTYPE ♂ Dagus trichocerus W. N. Mathis [name handwritten; red]." The holotype is double mounted (minute nadel), is in excellent condition, and is in the insect collection of the Instituto de Zoologia, Academia de Ciencias de Cuba, Havana, Cuba. Allotype and 27 paratypes (20 ♂, 7 ♀; USNM, Cuba) bear the same label data as the holotype. A paratype ♂ is from: CUBA. San Juan Mountains, Jan 1927, ALMelander Collection 1961 (USNM).

Distribution.—Apparently endemic to Cuba.

Etymology.—The specific epithet is of Greek derivation and is a combination of *trichos,* hair, and *keras,* horn, in allusion to the conspicuously haired and elongate arista.

Remarks.—This species is most similar to *D. rostratus* but is distinguished from it by the elongate arista, which is conspicuously haired, and by the mostly white, microtomentose vestiture on the sides of the face.

I collected the topotypical type-series of this species from exposed rocks situated in and along the margins of a small river. The river had a series of small waterfalls within the area I collected, and the flies were most common on the immediate splash zone of the rocks.

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